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The AMERICAN HOROLOGIST

OFFICIAL NATIONAL PUBLICATION

Vol. IV JANUARY, 1939 No. 1

THE AMERICAN HOROLOGIST

Official National Publication of the United Horological Association of America, Inc., and Its Affiliates

Published under the direction of the U. H. A. of A., Inc., Executive and Technical Boards by the Roberts Publishing Co.

To inculcate the principles of the U. H. A. of A., fraternal and commercial advancement; to promote the welfare and enhance the betterment of its members; to cultivate good fellowship and a higher degree of knowledge in Horology; to be sent free monthly to all members. National membership, $2.00 per year. Make application to nearest secretary or representative. Addresses can be secured in the NATIONAL AND LOCAL INFORMATION column in this issue.

Address all communications to THE AMERICAN HOROLOGIST, 3226 East Colfax Avenue, Denver, Colorado.

Editor and Manager
ORVILLE R. HAGANS
Denver, Colorado

Associate Editors
FRANK FOEGLER
Cincinnati, Ohio

OTTO R. SABRO
Portland, Oregon

Technical Editor
W. H. SAMELIUS
Director Elgin Watchmakers' College.

Eastern Advertising Manager
LEONARD B. PECKWORTH,
11 W. 42nd St.,
New York City, N. Y.

All contributions and advertising material must be received not later than the 20th of the month. Advertising rates upon request.

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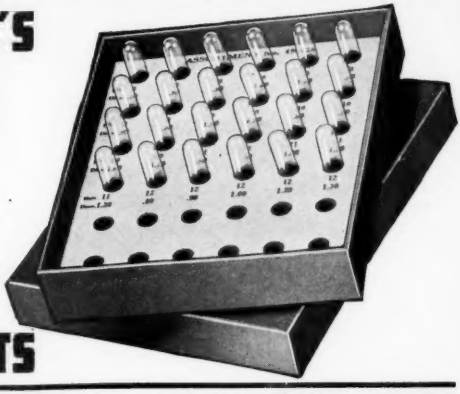
SWARTCHILD'S NEW FRICTION JEWEL ASSORTMENTS



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Hole sizes from .08 to .12 m/m and diameters from .70 to 1.30 m/m.
No. **49012A.** TWENTY-FOUR FRICTION JEWELS, as described.....**95c**

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The object of these six assortments is to permit the individual watchmaker to select friction jewel sizes most suited to his own requirements.

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Every friction jewel in these assortments represents fine ruby quality.

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Why We Should Have State Legislation

By WALTER SCHAEFER

HOROLOGY, a time-honored industry, is next in importance to the medical profession; for time is next to life itself. Time is of such importance to us today that good watches and clocks govern our every activity.

Anesthetics are administered by the watch of the one who gives the anesthetic. Trains are dependent on the watchmakers' skill and accuracy. Great ships are dependent on accurate chronometers to make their observations and calculations. The value of accurate time is of great importance in every walk of life and is, in many cases, the thing upon which hinges the difference between life and death. We have reached a point in civilization where time must be measured in seconds and split seconds. It is no longer sufficient for a watch to run within a minute a day, as was true in years gone by. Horologists of today, to perform their work as it should be done, have to be highly skilled, and spend many hours on a watch after it is repaired to adjust it to accuracy.

Unfortunately the depression years have brought about a condition of commercialism which has made great strides toward lowering this highly skilled profession to a point where the public is bewildered and at a loss to know where to go to have a watch properly repaired. There is many a nice fellow, who cannot properly repair and adjust a watch, and there is no way for the public to discriminate. There are, even now, many really good watchmakers, but the public does not know them or is not in a position to discriminate for there is no way to tell the good from the bad.

Customers who want the best and are willing to pay for it, most times patronize the high-class jewelry stores. But it is sad to say that some of the biggest, most ostentatious stores are the biggest cheats and "Gip Joints". This is not true of all. But the honest, ethical stores are placed at a decided disadvantage because of the unethical methods in advertising used by the unscrupluous ones and the stigma of poor workmanship, which they must share because the innocent suffer with the guilty.

The ethical watchmakers, both large and small, find that this evil has eaten into the vitals of their business; and though they too fight the evil, their fair-minded methods are not sufficient to combat the price appeal to a price-minded public. John Ruskin said, "There is nothing that some man cannot do a little cheaper; and he who looks for price alone, is that man's lawful prey." That is true in all things and all professions, but that is what the control legislation is for—to save the public from itself. Think what the public would suffer at the hands of unscrupulous men in the medical profession if it were not controlled.

We recently witnessed in Indiana the passing of a barbers' law to protect the citizens from dirt and infection. It is equally important, or perhaps more important, that people could rely on State Legislation to protect them against poor watch work when their lives depend on timepieces carried by doctors, nurses, persons whose duty it is to give anesthetics, train men, air pilots, etc.

But it is also an important factor that the public should be protected against the enormous loss in money they incur each year through poor work on watches, which has been estimated at $3,000,000, to say nothing of ruined watches, which would run it still higher.

Considering that twenty states are preparing to present bills to their legislatures this year. Can you imagine the loss the citizens of Indiana will suffer if it remains an open state and a "dumping ground" for all the unethical watchmakers from these other states?

Those who do not understand the situation cannot help themselves, but they will suffer the loss. Those of us who do

understand and know the situation and do nothing about it are to blame for allowing it to continue.

Legislative control is the only solution for the problem. Even our supply houses are handicapped without it; for they cannot refuse to sell to the unethical unless we have such a law. Legislative control would not relieve the situation immediately because all those now practicing would have to be admitted. But it would prevent the unskilled from settling here; and in time, no doubt Indiana citizens could feel secure in the fact that those who practice will be educated for the work, which we all know requires much time, effort and money.

Every step in civilization's progress has a more and more complex material accomplishment and these interwoven relationships of modern life, in which time is an important factor, can only be sustained through the use of acurate time-measuring instruments. In other words, civilization leans upon the watch and involves a closer and closer recording in smaller divisions of time by exact methods.

The middle ages produced clocks and watches; and clock and watches make the age in which we live. Man labored for thousands of years to produce a contrivance that would really tell the time.

Timekeeping has always been a part of history, and history a part of timekeeping. The entire universe revolves around time. Our civilized world came about through time. Everything we see and know is based upon time alone. Stop and think for a moment the necessity of time. The world would stand still without it. Then consider that recording of time dates back to the beginning of time. It was, and is, a science. The most scientific men of the world respected the ability of scientific watchmakers.

We must take steps to protect and preserve the science of Horology!

If your spirits are low, do something; if you have been doing something, do something different. — Edward Everett Hale.

An Inventory

January is the month for taking an inventory of our assets and determining our progress or regression. In Association work, we cannot list our tangible assets but we can analyze our accomplishments and by comparing with the past, determine our progress.

In my own experience (I hope you will compare your "inventory" and see where we each could have done better) about four years ago, the Wisconsin Watchmakers Association was started by a group of Milwaukee Watchmakers. At first I wasn't a member. When approached, I said I'd had enough of watchmaker organizations and would never again belong to or support such a group. Several months later, I consented to join with the distinct understanding that I would not hold an office or take an active art.

This Association was dedicated to the welfare of the Wisconsin Watchmakers and its purpose—to do all things necessary and proper to attain this end. It immediately affiliated with U. H. A. and has received the assistance of and has supported U. H. A. in its work for the trade nationally.

We had many plans for the betterment of our craft, one of which was Statutory Licensing of all watchmakers. Because this had always been a dream of mine, I accepted the chairmanship of the legislative committee. A little later I became secretary of the Milwaukee District Guild.

By November, 1936, our State Association, of which I was then secretary and Legislative Committee chairman, had acquired sufficient state-wide strength to warrant an attempt to obtain legislation. My committee was directed to proceed with its plans to have the legislation enacted. After much hard work the bill became a law on April 29, 1937.

Since then we have seen many things happen which seemed impossible when we started our program. Our Association grew by leaps and bounds. It was

supported wholeheartedly by the craft and jewelers everywhere. The State Board was appointed in accordance with the recommendations of the Association. The new law was put into effect immediately with the following results:

1. Price advertising stopped.
2. "Gyp joints" folded up.
3. The morale of the trade arose.
4. The watchmakers were no longer penny-ante racketeers but professional men.
5. Standards of workmanship and apprenticeship regulations were established.
6. Unethical conduct was punished by revocation of license.
7. Watchmakers studied and practiced to make themselves more competent.
8. Better jobs opened for craftsmen and the demand for $15.00 and $20.00 a week workmen subsided.
9. Persons coming into the trade were required to pass an examination before the Board, thus keeping out the poorly trained and incompetent watchmakers.

Briefly, from the time we determined to work NOW with all our might for concrete improvement (licensing legislation), we gained in strength and enjoyed success.

If you have been waiting for the strength to succeed, *start now to get your legislation.* Strength and success will follow.

This is our inventory. How does your inventory compare. The net result of the inventories of the various State Associations is the inventory of U. H. A. U. H. A. will guide and help you but the determination to succeed must be yours. Together we will achieve for the watchmaker of America, his rightful place in society as craftsman in the world's finest craft.

B. W. HEALD, *Secy.*

Incomparable
Watch Case Repairing
OUR WORK COSTS NO MORE THAN ORDINARY WORK
BECKER-HECKMAN CO.
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A PROVEN FACT!

Hand cleaning methods are a thing of the past. Today, when every minute saved is another dollar earned, an EFCO Electric Watch Cleaning Machine is a definite asset to your business! EFCO scientifically and safely cleans all parts — using the new, improved EFCO Fluids to clean, rinse and polish in a modern, quick 3-in-1 process.

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Precision built, has automatic jar centering device. $42.50

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$1.75 Gal.
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EFCO MANUFACTURING COMPANY
56 CLINTON ST., NEWARK, N. J.
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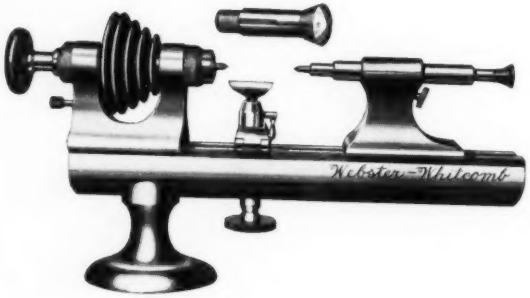
Genuine *Webster-Whitcomb* Watchmakers Lathes



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$67.50

This new low price indicates no compromise in the superior quality of these famous lathes, made in Waltham, Mass., by F. W. Derbyshire, Inc.—leading lathe manufacturers since 1872.

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Genuine WEBSTER-WHITCOMB Lathes are carefully made to insure accurate service over a long period of time. When used with genuine chucks, the WEBSTER-WHITCOMB Lathe will provide unexcelled service.

Your Lathe is only as good as your chucks: for full accuracy use the genuine. Made of hardened and spring tempered tool steel, the body diameter and angles are ground concentric and holes are diamond lapped to true size.

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$1.65

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M. J. LAMPERT & SONS, INC.

37 Maiden Lane **New York City**

Exclusive Wholesaler Distributors

State of Wisconsin
Wisconsin Board of Examiners in Watchmaking

In the Matter of the Revocation of Certificate of Registration No. 957 Issued to Robert J. Meyers, Milwaukee, Wisconsin

FINDINGS OF FACT AND CONCLUSIONS

Pursuant to the provisions of Chapter 125, Wisconsin Statutes, the Wisconsin Board of Examiners in Watchmaking, did issue and cause to be served upon the said Robert J. Meyers, on the 28th day of October, 1938, a notice in writing enumerating charges and specifying November 29, 1938, as the date for hearing thereon. Thereafter, on the 29th day of November, 1938, the proceedings regularly came on for hearing at a regular meeting of said Board and before a quorum thereof; C. G. Anderson, R. L. Bringolf and B. W. Heald, members of said Board appearing for the Board. Respondent appeared personally and by his attorney, Nathan Ruppa of the law firm of Rubin, Zabel and Ruppa.

Testimony and other evidence in support of the charges set forth in the notice was presented by the Secretary of said Board. Respondent presented no testimony or evidence in opposition to the said charges. All testimony and other evidence was duly recorded and filed in the office of the Secretary of said Board.

The Board having taken the matter under advisement, having duly considered the same and being fully advised in the premises, does make this its Findings of Fact and Conclusions:

FINDINGS OF FACT AND CONCLUSIONS

That the Respondent was and until this date, has been a watchmaker engaged in said craft in the City and County of Milwaukee, State of Wisconsin, duly registered in accordance with the provisions of Chapter 125, Wisconsin Statutes, and is the holder of Certificate of Registration numbered 957 issued by this Board in accordance with the provisions of Section 125.06 (3), the so-called "previous practice exemption clause"; that the respondent is the operator and proprietor of a watchmaking or watch repairing department in and under the name and style of "Hill's Department Store" in the City of Milwaukee.

That, as charged in said notice, Respondent did, on or about the 25th day of August, 1938, prepare and distribute or permit to be prepared and distributed for him and at his expense, advertising in which misleading statements were made, to-wit: an implied offer to the public that watch repairing would be done at a special price of 69c, when in fact watch repairing was not available at that price or at a price reduced in any amount. That such offer constituted a misleading statement.

That, as charged in said notice, respondent did on or about the 19th day of October, 1938, prepare and distribute or permit to be prepared and distributed for him and at his expense and for his benefit, advertising in which misleading statements were made, to-wit: offering to the public that he would rebuild watches for $3.95, when in fact no work of any kind was intended or would be done upon the mechanical parts of the watches advertised to be rebuilt at that price. That in the accepted usage of the term "rebuilt" as applied to watches, such term necessarily includes completely disassembling, repairing and reconditioning the mechanical parts thereof. That such offer constituted a misleading statement.

That the offenses charged occurred subsequent to warning given to the respondent by the Board; that respondent has persistently advertised so as to indicate to the public that he offers special

value, when in fact, he has not given special values.

That the offenses charged constitute unethical conduct within the intent and meaning of Section 125.08, Wisconsin Statutes.

That the respondent, Robert J. Meyers, is guilty of unethical conduct as defined in Section 125.08 and his Certificate of Registration numbered 957 is subject to revocation in accordance with the provisions of said section.

Dated at Milwaukee, Wisconsin, this 30th day of November, 1938.

By the Wisconsin Board of Examiners in Watchmaking,

B. W. HEALD,
(Seal) *Secretary.*

STATE OF WISCONSIN
WISCONSIN BOARD OF EXAMINERS IN WATCHMAKING

In the Matter of the Revocation of Certificate of Registration No. 957 Issued to Robert J. Meyers, Milwaukee, Wis.

ORDER

This Board having fully considered all of the testimony and other evidence presented in this matter, being fully advised in the premises and having made its Findings of Fact and Conclusions;

Hereby Orders that the Certificate of Registration numbered 957, issued to the respondent, Robert J. Meyers, be and the same is Hereby Revoked.

Dated at Milwaukee, Wisconsin, this 30th day of November, 1938.

By the Wisconsin Board of Examiners in Watchmaking,

B. W. HEALD,
(Seal) *Secretary.*

Patronize Our Advertisers

BOWMAN Technical School
Courses for Success for **WATCHMAKERS ENGRAVERS, JEWELERS**
Write for free book "Your Future and Our School"
JOHN J. BOWMAN, Director
Bowman Bldg., Lancaster, Pa.

Membership Notice

Dues become due and payable this month. If your card reads 1938 it is out of date, and you are not in good standing locally or nationally.

See your secretary today. Don't wait for him to dun you. He is no doubt very busy with local and state affairs in your best interest. Make your organization officers' work a bit brighter. Pay your dues now. No further notice will be issued members regarding this subject.

Pay your plaque rentals at once and receive your 1939 plates; or return your plaque to National Headquarters. Thirty days' delinquent on plaques call for replevy of same.

Let's all do our share and act now—not tomorrow!

National Executive Secretary.

1939 Greetings

This month marks another milestone in the lives of all Horologists—a milestone long to be remembered in horological history; for this year we shall see many legislative bills presented in their interest, which will pass and become laws. Some will fail to pass for varied reasons, but which will act as guides to mistakes made and will further strengthen the movement for future success.

The U. H. A. of A. and its affiliates, the largest groups of horologists in America, have made outstanding gains in this and all other progressive undertakings. Its groups who have availed themselves of services available are truly strong and successful guilds and associations.

The 1939 National Convention being held in Pittsburgh, Pennsylvania, May 14th-15th-16th-17th will be one of outstanding accomplishments. It is predicted that this will be the greatest of all conventions. To miss it will be a definite loss to you.

THE AMERICAN HOROLOGIST enters its fourth year with an increased circulation far greater than was ever ex-

pected, and according to the activity, this circulation will be overshadowed in a few months' time.

The publication's library of educational service materials has grown to great proportions and continues to increase monthly.

U. H. A. A. will have a splendid report to make at National Convention with many more new affiliates.

The entire officer personnel wish you and your organizations a most prosperous and active 1939.

What Others Think

The Educational Service Directory and the National Office Report No. 1, I received yesterday.

The Educational Service Directory acts as a catalogue or reference book, listing of the various items under a given number, which should make it easy for any organization to order their specific subject for their organization work.

I consider it well worth the price it costs, and no affiliated organization should be without one.

The National Office Report is a wonderful setup and idea and well arranged, and a medium which will enlighten the Trustees, as well as the members of any organization, when read in an open meeting, it exemplifies what the National Organization is doing from time to time, for the best interest of its members, and in time will create a feeling of satisfaction that the National is trying its utmost to build up the standard for the Horologist.

Sincerely yours,
ERNST WETTEROTH,
Nat'l Treasurer.

CLOCK DIAL REFINISHING
We specialize in duplicating, restoring and refinishing clock dials of every description. Metal, Wood, Glass, Porcelain, Antique or Modern. Glass Paintings for Early American Clocks. Send for Price List
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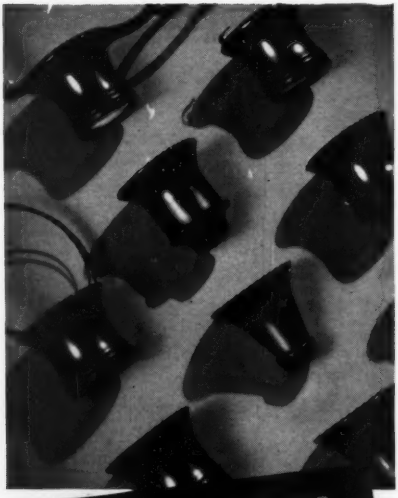
"There are six one drawer Unit Systems completely described in the last Newall Finger Print Catalog. Pages 30 and 31 will give you all the dope you need. If you haven't a copy you can get a free one by writing to . . .

Jerry Jeweler says—

"Get Results with Newall Unit Systems"

The Newall Mfg. Co. 29 E. Madison St., Chicago, Illinois



Your ability to turn out good work and fast work depends on your eyes. They must see clearly and without strain, even after long use. The few pennies extra that a Bausch & Lomb loupe will cost you is a small investment for the years of clear effortless vision it will give you.

Catalog, sent on request, lists 22 models of B & L loupes, 75c to $2.40. Included are the superb achromatic glasses. Special 18 power loupe, $3.00.

Your own jobber can supply you with Bausch & Lomb watchmakers' glasses and hand magnifiers.

BAUSCH & LOMB
OPTICAL COMPANY
262 BAUSCH ST. ROCHESTER, N. Y.

Description of Clock

By WARREN F. FRASER
Westboro, Mass.

Member of Boston Guild No. 1. Winner of First Prize in Workmanship Competition at National Convention Held at Boston, May, 1938.

This clock, which is a fine regulator with jeweled escapement, compensated seconds' pendulum and maintaing work is shown complete in Fig. 1 and dial and hands removed in Fig. 2. While in Fig.

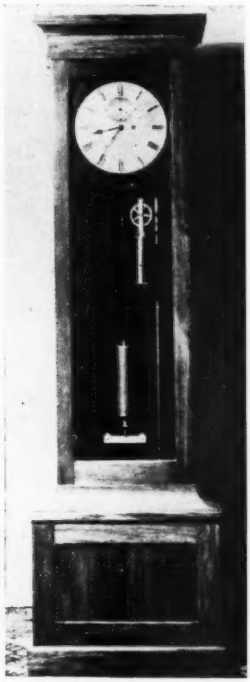


Fig. 1

3 it is shown with the movement removed to show more clearly method of compensating the pendulum. Figs. 4 and 5 show the front and back of movement respectively.

It contains several novel features that seek to improve the performance of regulators of the non-electric type.

The escapement consists of escape wheel and jeweled pallets that are substantially the same as the Graham Dead-

Beat. The pallet arbor carries upwardly extending cocks which move with it and in which are pivoted two gravity arms, each having a downward extension terminating in a horizontal part, forming one side of fork to engage the pendulum and a horizontal extension provided with a weight adjustably secured thereto. Between the downward extension of the arms there is an arm rigidly secured to the pallet arbor and limited in its motion by two pins in the back plate of the movement. (This construction is clearly shown in Figs. 4 and 5.)

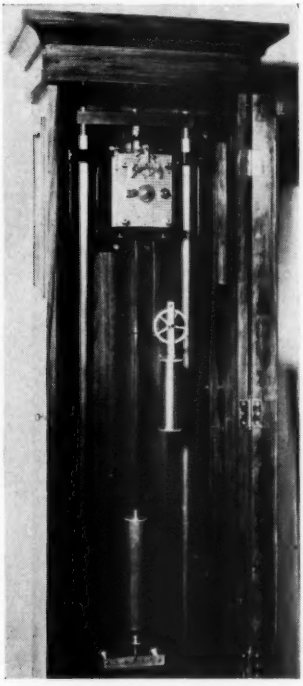


Fig. 2

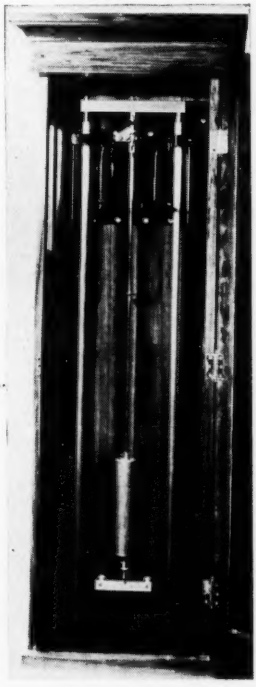


Fig. 3

It will be seen in this arrangement the motion of the pallets is limited by the pins in the back plate of movement, and rod attached to pallet arbor, to an amount just sufficient for escaping; and during the escaping arc the pallets and gravity levers remain in the same relation to each other and the action is identical with the Graham escapement, but outside the escaping arc the gravity arms come into action one at a time to permit the pendulum to swing without the pallets following its motion with the result that we get rid of the friction due to moving the pallets under the pressure of the escape wheel tooth upon its dead surface, which is a substantial saving in power and friction.

By withdrawing the limiting pins from the back plate the escapement functions exactly as a Graham, and the swing of the pendulum decreases a noticeable amount.

The escaping arc is just under 2°, and the total arc of swing is 4¼°. The escape wheel is 2″ diameter of hammer hardened brass and very light in order to reduce its enertia.

The great wheel arbor turns upon roller bearings and the back center pivot, also the weight pulley, turns upon ball bearings.

The pendulum consists of a steel tube 3/8" O.D. with .050" wall, a 15-lb. babbitt metal cylindrical bob supported at its center or slightly below its center so that the bob remains neutral as regards compensation. This construction gives a pendulum, in which the weight is concentrated in the bob, to a very high degree, which is very favorable to a steady rate.

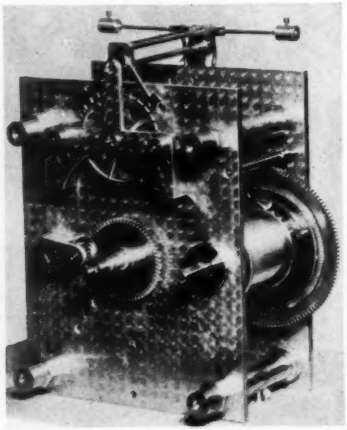


Fig. 4

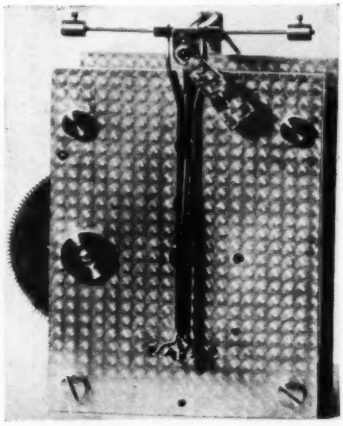


Fig. 5

The compensating means is external to the pendulum, and is best seen in Fig. 3, in which the two outside rods and steel tubing are secured to the mounting bracket, which also carries the chops between which the pendulum spring goes and which limit its acting length. These outer tubes are secured at these lower ends to a cross piece of steel to which the two inner tubes of brass are secured. These brass tubes pass freely through the mounting bracket and carry a heavy steel cross piece, from which the pendulum is suspended by the suspension; spring passing through the chops which are attached to mounting bracket.

It will be seen that the active length of pendulum terminates at the lower edge of the chops, and the chops are adjustable so that they may be set as close as possible without clamping the suspension spring. Therefore, it will be seen that with a rise of temperature the pendulum rod lengthens, but the brass tubes of the compensating means expand upward enough more than the steel tubes expand downward; thus raising the pendulum spring through the chops an amount sufficient to keep the pendulum length constant thus offsetting the effect of temperature on same.

It should be noted that the compensating rods extend above and below the pendulum into both warmer and colder air than the pendulum is exposed to, so that the average is the same. It being well know the temperature of a room varies, being colder at the floor and increasing as we go toward the ceiling. Also, all the parts affected by temperature causing an error in plate and in compensating for same, being of tubing and not solid rods, they respond promptly and alike to changes of temperature and thus make a good method of compensation for a pendulum running under room conditions as distinguished from observatory conditions.

300-Year-Old Clock Runs

Irish Grandfather Timepiece Has Withstood Several Burials

Lakeland, Fla. — A big grandfather clock made at Ballymena, Ireland, more than 300 years ago was buried several times when warfare brewed in Erin. Each time it was dug up and ran smoothly afterward.

Finally, in 1763, it was brought to America. It passed from one generation to another, until now it is owned by Mrs. D. J. Browning, 82-year-old Lakeland woman.

The clock still keeps good time and records the days of the month as well as the hours and minutes. It runs by old-fashioned weights and has to be wound only once a week.

Time and Cement

A clock patented here automatically registers the time it takes cement to set. The invention (patent No. 2,129,043) is the work of Peter Bortsch of St. Peter, a village near Graz, Austria. A rod from the clock to which a weight is attached is inserted in the freshly poured cement. As the clock unwinds the rod gradually sinks into the cement. When the cement has set the rod stops sinking and the clock automatically stops.

Court House Clock Vital

Albany, Ore.—A public furore over disposition of the Linn County Court House clock was stilled when county officials promised that a clock would be installed in the new court house to supplant the timepiece in the old building by which an estimated one-half of the town's residents told time daily.

The citizens also were informed their ears would not be subjected to the harsh notes of a new chime, as the old clock chime was removed and would be attached to the new clock to be installed.

Two New Assortments of Seitz' Friction Jewels

The new assortments of convex balance olive hole and center-wheel jewels are on market now. U.S.A. watchmakers will be glad to know that the two assortments they always suggested are created.

Your Supplier Will Be Pleased to Give You Particulars About the Two New Assortments.

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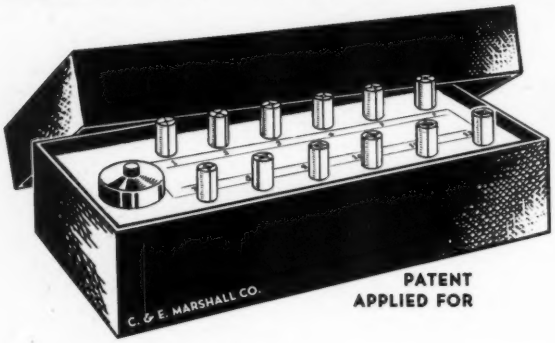
Here's News in FRICTION J



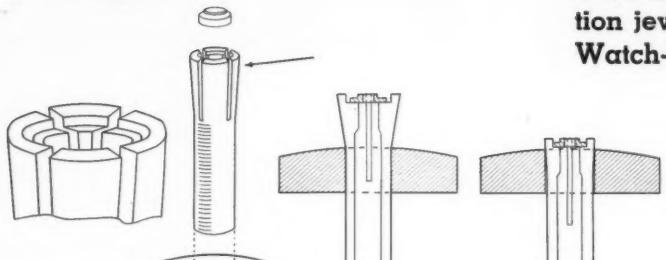
PATENT APPLIED FOR

WATCH-CRAFT

REG. U.S. PATENT OFFICE No. 348,[illegible]46

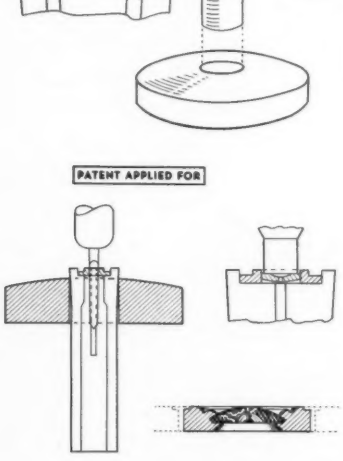
JEWELING

Ever since the advent of the Fri
been a need for an attachment
tion jewels in settings that form
Watch-Craft Friction Jeweling C



The operation o these
in your friction jeweli
is simplicity itself. Se
chuck of the proper
hold the setting that i
reamed. Place this ch
the chuck closing coll
put in the frame of the
ing tool. It is then pushed down with a jewel
until the chuck closes firmly on the setting,
it secure for reaming and setting friction jew
remove the setting after the job is completed
remove the chuck and collar from the frame an
down around the collar. This allows the chuc
pand and release the jewel setting.

PATENT APPLIED FOR



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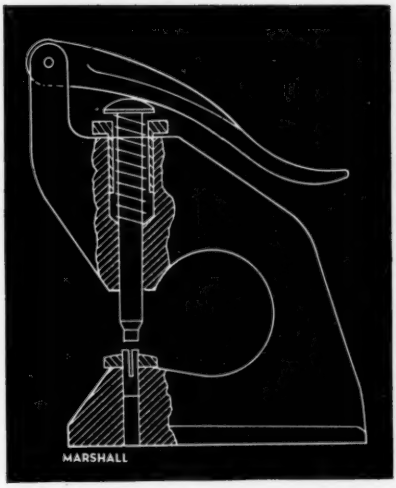

of the Friction Jeweling Tool, there has tachment to facilitate the setting of fric- that formerly held burnished-in jewels. eweling Chucks fill this need.

these chucks on jeweling tool itself. Select a proper size to ng that is to be ce this chuck in osing collar and me of the jewel- h a jewel pusher setting, holding rict on jewel. To ompleted simply frame and press the chuck to ex-

These chucks are made in a set of twelve ranging in sizes correct to handle all balance jewel settings from the smallest to the largest.

The use of "Watch-Craft" Friction Jeweling Chucks will make the setting of jewels in jewel settings as simple as it has been to set jewels in plates, and increase the usefulness of your friction jeweling tool beyond your greatest expectations.

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Young Men and Watchmaking

By HENRI GRUSIN

A YOUNG man interested in entering the profession of watchmaking should consider, primarily, his fitness for this particular work. This cannot easily be determined by the young man himself, not knowing what it is like beforehand, he cannot be sure of what success he may expect as an apprentice or as a student in school. It is not enough that he expresses a desire to learn the art, or that, as in many cases, a son steps into his father's repair shop; or, as an errand boy to the watchmaker, he begins to tinker with tools.

It is not often that an American young man will lose sight of his possible future earning ability. It would be senseless for him to use his probable salary as a yardstick of his future ability. Nor would it be commendable on the part of a teacher to accept a student only on the strength of the expressed desire by the latter.

It must be realized that the young man is making an important decision, perhaps the only decision that will shape his life more than anything. Is not one's advice to the young man equally serious?

A school of horology may be ever so equipped as to matriculate students as master mechanics, only to find them later experiencing drudgery at meager wages —just as brilliant students in law and medicine become failures after being on their own. Of course, that has long been thought of as a matter of fate and no one was to be responsible.

We are now entering a phase in scientific research that does away with the hit-or-miss method in selective occupations. According to fitness most failures are preventable. That is to say; the applicant's fitness for the particular occupation may be pre-determined.

To be specific, let us, for example, point out that, according to this new science, *interest is no guide to aptitude* and that tweezer dexterity and finger dexterity are two distinct characteristics.

It goes without saying that mathematical knowledge, resourcefulness, good eyesight, tendency to precision in all things and patience are the prerequisites of the applicant. But these qualifications without natural aptitude will prevent their co-ordination, resulting in a mediocre workman despite fine training.

No science dealing with the human mind can be expected to work absolutely perfect. But from results obtained thus far by the Human Engineering Laboratory in Occupational Guidance, it would seem that THE AMERICAN HOROLOGIST as well as responsible Horological Schools would look into the matter for the benefit of applicants and others seeking advice.

We have gone a long way toward developing tools, materials, alloys, lubricants, and precision devices; let us catch up with the human element without which all these are without meaning.

GOOD MAINSPRINGS

Are important factors in the operation of your repair department. The best watchmaker is handicapped if using inferior mainsprings.

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This may be done through scientific selection. It is not too much to ask of our horological schools to exercise extreme care where scientific selection is not possible, particularly, since it is the aim of all schools not only to turn out good mechanics but happy men as well. Without natural aptitude happiness in one's occupation may be questionable.

What is known already on the subject should be sufficient to point the way toward development of better horologists in the interest of the public and themselves.

New Organization Aids Available

Several new aids are now available in limited quantities to associations and prospective associations. These pamphlets and booklets are:

"Educational Service Directory," listing hundreds of slides and thousands of feet of film, 16 mm. and 35 mm., as well as all association material, 260 pages, price 50c.

"How to Organize." This booklet has aided many an association and guild. You will find it a real aid. Free.

"Organization Talks" embodies twelve effective and helpful talks for associations and guilds. Free.

"Legislative Aids." A recent compilation of such material as will help all seeking watchmakers' protective legislation. Questions and answers of a popular character. Proofs, programs for financing, etc. Free to associations.

"Membership Campaign Aids." A complete series of letters for new, old and delinquent members, jewelers, etc., as well as popular questions and answers. Free to associations and guilds.

All of these booklets are in limited quantities, and we reserve the right to refuse same to parties, should supply run low.

Educational Service Notice

All guilds and associations not using old slide catalog are herewith notified that same is obsolete, and orders cannot be properly filled from same. Secure the new Educational Service Directory at once and comply with all new and additional rulings.

Your National is progressing. Keep in step, and up to date! New ideas, programs and services are now available.

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"Meeting Programs."

"What Officers Should Know."

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Fulcrum Oil Co. **Franklin, Pa.**

Fixing 100 Clocks Is His Job

Keeping 100 clocks in trim is a task any day, but when every one of them suddenly has to have its hands moved forward 11 hours it's immense.

William Morrison, master clockman of the University of Pennsylvania, has quite a chore of changing all the university clocks from daylight saving to standard time.

Man in a Clock As Seen from Below: William Morrison Pops Out (Through a Door) of the Clock in the Provost's Tower, University of Pennsylvania Dormitories, 36th and Spruce Sts.

He's more or less resigned to the task by this time, having done the job for 17 consecutive years now. It's not so much the number of hours he loses that worries him, but the number of steps he has to climb to get to the clocks.

If he isn't climbing five flights of steps to adjust the time of the clock in the Provost Tower in the university dormitories, he is climbing 35-foot ladders to lift the faces of the clocks in Weightman Hall facing Franklin Field.

Morrison is also university locksmith. "I like locks," he says simply. "They don't have hands."

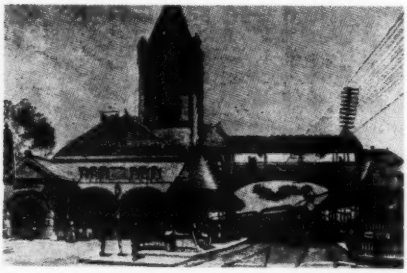
But he is really proud of pinchhitting for Father Time.

"For think of the number of students my clocks have helped put through college," Morrison muses. "I keep the clocks accurate, and the boys can't help getting to classes once in a while because there are so many clocks around."

When time changes from daylight saving to standard and vice versa, twice each year, Morrison spends all day Sunday changing time at the university. Then he sighs with relief as he starts for home—until he remembers he has to wind his own watch.

Fifty-Two-Year-Old Clock May Tick for First Time

Silent for fifty-two years, the clock in the New York Central Tower may give its first tick soon. The city's oldest timeless timepiece. The four-faced clock without works or hands in the tower of the New York Central's 138th St. Sta-



tion finally may become a self-respecting ticker that will really tick. So that this clock, by next month, will have let fifty-two years tick by without having recorded a second of them; and may have to go to work if the station gets a dressing-up as a terminal for the World's Fair.

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Removing Screw Plugs

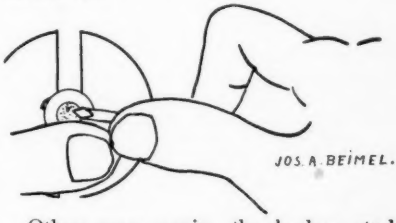
By JOS. A. BEIMEL,
Member National Technical Board, U. H. A. of A.

AMONG the most common forms of mishaps at the bench, even among careful workmen, seems to be the breaking of screws. Screws will twist in two and screw heads will occasionally snap, due to the material of which the screws are composed. Many of the cheaper grades contain poor quality of steel, while others are burned during the hardening process.

In most cases, screw heads that snap off due to being too brittle are usually too hard to drill into the remaining plug. Screw extractors are not always suitable and chemicals that eat up steel particles are not always advisable nor convenient for use, and more practical methods of removing the remaining plug must be resorted to. Screw heads that frequently snap off are those holding the ratchet wheel to the arbor. Such screw heads are usually larger. One uses a larger screwdriver in turning it, and unless the screw is of better steel, it is most likely to snap and leave a remaining portion of the screw in the arbor. Of course, if the plug can easily be gotten hold of with the tweezers, it may be readily turned out, but if it remains some depth within the arbor, then special care must be exercised in the removal of the plug, lest you find it necessary to replace a new arbor or even make one.

To remove the broken plug, it is best to begin by testing with a steel point somewhat on the order of a large strong needle, or marking tool. The point of needle should rest against some slight bump on the plug, or a slight depression or small hole in which the marker or steel point can be securely placed. Test by attempting to turn the screw plug, remembering at the same time whether it is a right or left handed screw. In a number of cases such a broken screw may easily be turned out if one is careful not to mar the ends of the threaded arbor. A few attempts will usually bring it out sufficiently to where it may be gotten hold of with tweezer.

If on the other hand the remaining screw plug seems tight, then it is better to remove the arbor from the barrel and clamp it in some form of vise. Something that will not mar the outer diameter of the arbor. When once clamped, a little more power may be applied to the broken plug, using the steel point carefully, and the broken piece may be turned out.



Other cases again, the broken stud may be quite too tight and the steel point may not move it. It is then that a well pointed graver is a most welcome tool. The graver must be of the kind that has attached a form of butting end or better termed handle which rests in the palm of the hand, and is used to push against. The graver must first be brought to a sharp point on the oil stone and frequently tested while using, to be sure that the point has not nipped off. A blunt point may mess up the entire job, moreover if not well pointed, it is apt to skid or slip and run into ones finger, which is not a pleasant experience. On the other hand, if well pointed, it will rest nicely at some spot on the broken plug and be readily turned. Gravers have many shapes and one must select the type best adapted to his own use, as well as the kind of screw plug to be turned out.

To assure safety in removing plug, it is well to bring both thumbs in contact, the one of the left hand to act as a sort of guide. See illustration. The pushing is done with the palm of the hand, in which the handle rests. If the point

bears well against a slight projection and starts turning even slightly, one may feel hopeful of removing the broken screw by making several attempts, until it may be gotten hold of. Of course, there is no absolute assurance that any method will remove all sorts of broken screws. Some of them are quite tight within the arbor and may be too deep to be gotten at with either point or graver. The writer has removed many screw plugs and some of them quite deep with the arbor or other plates, and believes others may derive some benefit by attempting the same method.

For methods of sharpening gravers, the reader may refer to Harold Kelly's article in December, 1937, issue of AMERICAN HOROLOGIST, page 16.

Colorado Legislative Work Progresses

Colorado Legislative Committee is meeting every other night to perfect their

B. W. Heald,
National Legal Advisor,
President of
U. H. A. of A.

plan and program for the successful passage of their proposed bill, which will be presented to the State Legislative body in the first session in January.

February 14th a large state mass meeting will be held in the honor of Harrison F. Babcock, President of H. I. A.,

D. E. Heigert,
Chairman, Colorado
State Legislative
Committee and
National Trustee

Harrison F. Babcock,
President of
H. I. A.

who is making a trip to Colorado and will speak in behalf of the successful passage of this proposed act.

The State Legislative Committee have also secured the personal services of National Legal Advisor and President of U. H. A. of A., B. W. Heald, who will appear in person before the State Legislature, devoting as much time as is necessary to successfully put the issue over. The date of his appearance in Colorado will not be known until a report from the State Legislation has been made.

ORVILLE R. HAGANS,
Sec'y, Legislative Committee.

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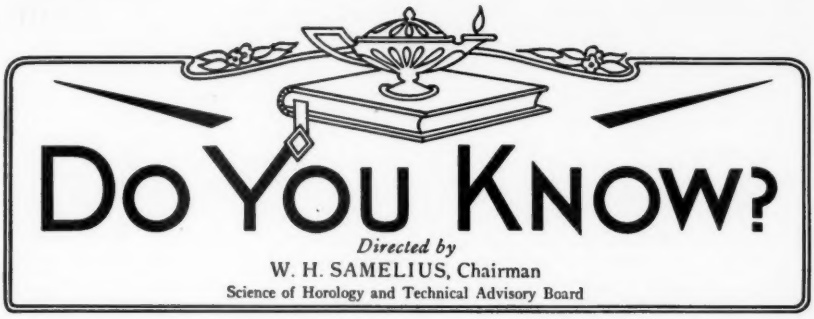

High grade silver plating is supposed to be about in the proportion to one ounce of silver to a square foot of surface.

How dear to our hearts are the big silver dollars,
When some kind subscriber presents them to view.
They may come today or they may come tomorrow,
They may come from others, they may come from you,
The big silver dollars, the round silver dollars,
Dear delinquent subscribers, present them to view.—(O. R. Hagans.)

Standing in the entrance hall of the Hobbies Museum is an exceptionally heavy carved oak clock that stands 12 feet high, 4 feet 9 inches wide. This elaborate clock was built by Joshua Hampson in England, in 1743, and is said to have stood in the great hall of the ancestral castle of the Earl of Durham. It shows the phase of the moon, has a full set of chimes playing Home Sweet Home, Mistletoe Bow, Bonnie Dundee, Jenny Jones, Auld Lang Syne and Old Hundreth. The dial is elaborately enriched with the Coats of Arms of London. This clock also shows the date and month and there is an indicator hand that controls the striking mechanism for strike, silent or chimes.

The oldest watch in existence of known date was made by Jacques de la Garde of Blois, France, 1551. It is in the Paul Garnier collection in the Louvre Museum, Paris.

All watches not round in shape are measured across the smallest diameter to give the size. One ligne equals 2.255 mm.

Yankee clocks with wooden movements were made between 1810-1840. After that date brass movements were made.

Between 1790 and 1850 most of the tall grandfather clocks in the United States were made by local clockmakers.

The oldest known timepiece in existence is a clock that was made between 1390 and 1400 for Dover Castle, England. This old timepiece now reposes in the South Kensington Museum, London, England.

In 1836, the combined production of sixteen clock factories making brass and wooden clocks amounted to approximately 100,000 timepieces per year. These factories were all located in Bristol, Connecticut, which was then the center of the clockmaking industry.

It is said Benjamin Banneker, the son of a freed African slave made a complete clock from wood, using only a pocket knife and that the clock kept good time for many years.

The duplex escapement which was favored for many years was invented by Pierre LeRoy, Paris, 1757.

Watches made to wind through a hole in the dial were in common use about 1725.

Things Worth Knowing

By REV. FRANCIS BIMENSKI

MORITZ Grossman, the celebrated horologist (died 1885), while still young, used to pause and ponder while repairing watches, much to the despair of his employer. His object was to recall the principles taught by the masters and thus to verify the theory in life, and again, to try the abstract rule in concrete cases. He knew well that this inference from the theory to the practice, and again, from the practice to the theory opens our eyes to new experiences and paves the road to genuine progress.

Such an intelligent overhauling, so highly recommended, often becomes a dire necessity. Indeed, factories, fearing expenses in the changes of costly machinery, may allow minor imperfections to pass; or again, an unlucky hand may have tampered with the delicate mechanism and thus created serious conditions. In those cases, the watchmaker will have to pass judgment and distinguish the right from the wrong in order to correct the mistakes without creating new ones. This self-examination is a test of our actual correct knowledge. It will reveal to our astonisment how vague our thoughts and reasonings often are and will fit us for better work.

For experiment sake, it is well to take a carefully constructed watch; for instance, a Hamilton, size sixteen, with 21 jewels, the pride of the R. R. men, and observe closely every part, recalling at the same time the principles taught by the masters.

We are familiar with the lever-escapement, the survivor of one hundred kinds of escapements. It is called, too, the semi-detatched or the king of escapements. It was invented by Hook (1650) and perfected by Graham (1690). However, since Mudge left us the first definite description (1799), history reserved for him the honor of posterity. Quite naturally this escapement underwent many change in the course of years. For instance, Mudge's pallets embraced five teeth out of twenty, and the hairspring is not the kind of modern times. But each master tried his hand, adding, but mostly simplifying, as the last famous watch-collection of Major Chamberlain clearly shows, until the last stage of perfection was reached in the model of today.

The Balance

The modern balance, or vibrating wheel differs from the simple balance of old. It has two loosely curving arms of two metals (brass and steel) fused together. The two-metal system was first introduced by LeRoy (1766) and perfected by Arnold & Earnshaw. The obliquely cut allows the stretching or shortening of the metal at low or high temperatures, and thus gives a way of compensation. In fact, the same heat that weakens the elasticity of the hair-

(Continued on Page 27)

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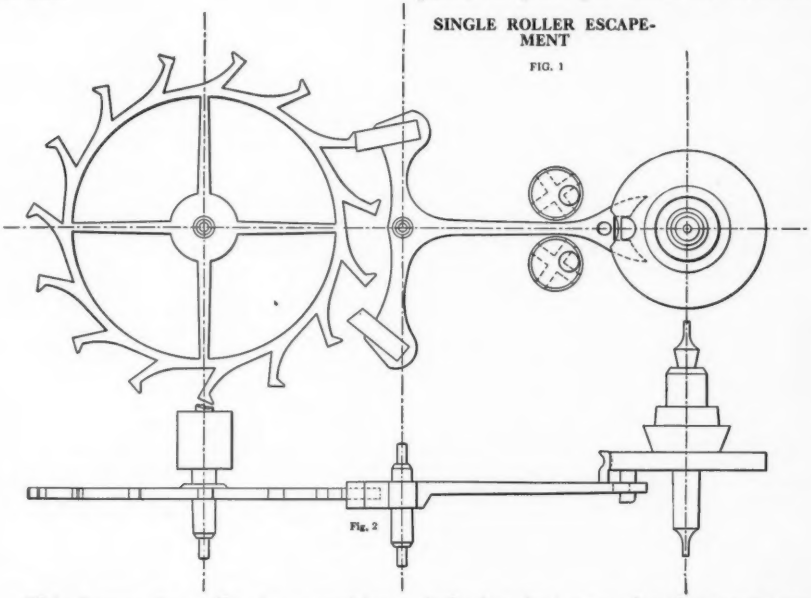
The Jewel Pin Action

By OLAF OHLSON

The fork and jewel pin action involves two distinct functions: the impulse and the unlocking. In order to illustrate and make this statement clear, we will consider the different parts of the escapement in a normal position, as shown in Fig. 1. The hairspring, controlling the balance, has brought the fork, by means of the jewel pin, to the normal position of rest.



SINGLE ROLLER ESCAPEMENT

FIG. 1

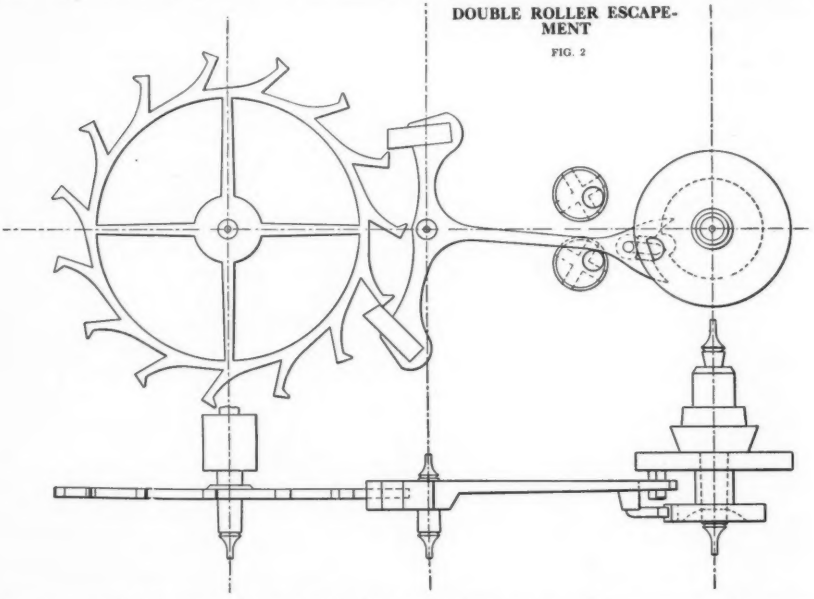
Fig. 2

This leaves the pallet in a position where the impulse face of an escape wheel tooth will engage the impulse face of one or the other of the pallet stones, in this instance the R stone. Assuming the parts to be in relation to each other, it is evident that when power is applied to the escape wheel, the escape wheel tooth, which is engaging the R stone, will cause the pallet to turn on its pivots, and this impulse is transmitted to the balance by the fork acting on the jewel pin. The impulse being completed, the escape tooth drops off from the R stone, and the second tooth forward comes to lock on the L stone, with the fork resting against the banking, as shown in Fig 2. The fork slot is now in such a position that the jewel pin may pass out perfectly free, and this condition is necessary because the impulse which was given to the balance imparted to that member a certain momentum, causing it to continue to turn in that direction until this momentum is overcome by the tension of the hairspring. During this part of the motion, which takes place after the impulse, the jewel pin leaves the fork entirely, but the instant that the momentum in the balance is overcome by the tension in the spring, the balance will start to turn in the opposite direction, the tendency of the spring being to bring the jewel pin to the center line. Before reaching this point, however, the jewel pin has to perform the very important function of unlocking. At the completion of the impulse we left the fork resting on the banking, with the fork slot in such position that the jewel pin *passed out* perfectly free, and, figuring on the assistance of the draft and the safety action, which will be explained later, we are justified in expecting that the

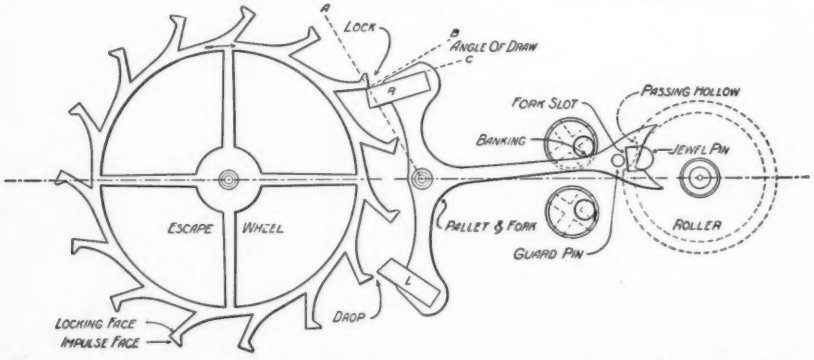
jewel pin shall *pass in* to the fork slot perfectly free. The instant the jewel pin has entered the slot, and comes in contact with the fork, the work of unlocking

DOUBLE ROLLER ESCAPEMENT

FIG. 2



begins. And here is to be noticed, that for every tick of the watch, the pallet and fork is started from the condition of rest, by a sudden blow of the jewel pin. And not only the pallet is started, but the *whole train has to be started in the reverse direction,* against the power of the mainspring, to unlock the escape wheel, in order to receive another impulse. The impulse on the L stone being completed, the pallet assumes the position shown on page 6. The jewel pin passing out on an excursion, the same as on the other side, returns to unlock, receives a new impulse, and so on, at the rate of 18,000 times per hour. In view of the above, it is evident that lightness, as far as it is consistent with strength and wearing quality, is an essential feature in the construction of the



several parts. It was once considered necessary to attach a counterweight to the pallet, in order to get it in poise, but with the modern light construction of pallet and fork, it has been proved beyond a doubt that the ordinary form of counterpoise was worse than useless, inasmuch as it involved an added mass of metal whose inertia must be overcome at each vibration of the balance.

Things Worth Knowing

(Continued from Page 24)

spring will curve in the loosened arms, diminish their diameter, and quicken the motion of the balance. The error is thus corrected. Quite naturally the proportion of steel and brass must be in such proportion as to offer equal resistance to bending and sensibility. This compensation is not perfect. The so-called middle temperature error survives (Berthoud 1775).

High-grade balances are made of nickel-steel and are called monometallic or integral. The alloy is the famous Invar of Didisheim, "Invar" (iable) in heat and cold (1899). The arms are not cut, because little compensation is needed. I say "little," because Didisheim and others tried to add delicate auxiliary attachments to reach a higher perfection.

This compensation process is still studied more carefully. The Elgin Invar Steel Balance of Raymond (1924) has bi-metallic rims, brass and Invar, and the curve of the angle has 35° instead of 13°. Of late Mr. Volet proposed a brass bar and steel rim while Strauman advocates the monometallic rolled zinc alloy,

The screws, of various composition (brass or gold), of various sizes and weights, are distributed around the circumference (five to eight on each side). Weight determines the number of vibrations. It seems to me that the constellation of the screws must affect the vibrations; in P V position, for instance, if too many are grouped together in one place. We might therefore distinguish a static and kinetic equilibrium. The size of the balance will influence the swing, which ought to be vigorous and yet constant. Thus we notice that Hamilton watches show fair sized balances. Elgin realized this point, putting an 18 size balance into a 16 size watch in one of the latest models (1927?). The horological schools of Switzerland worked out several tables to determine the classical (Geneva quality) size and weight. I don't know how American factories treat those learned tables. But I know that the Swiss are the masters of delicacy and elegance, while the American in his practical turn of mind is rather for models that will stand the wear and tear and has the balance heavier.

The qualities required of a well-formed balance are obvious: perfection in poise, perfection the flat and in the round. Poising means equal distribution of weight around the circumference. The good poising tool, or even a depthing tool, will detect any fault. The test at each quarter is considered fair, though not necessarily perfect. Perfection in the flat and in the round is tested with calipers and corrected by means of special tweezers and pliers. Trained thumbs and fingers are good natural pliers for that purpose.

The Staff

The balance is lightly yet firmly rivetted to a staff. The staff is a little complicated axle or shaft. It gives a firm seat to the balance, has to hold fast the hairspring and besides one or two rollers. High grade staffs have a groove to keep the oil in its place and hinder its spreading. The two cony ends rotate between the walls of two hole jewels and two cap jewels with a side and end play of .03 mm. The Swiss prefer the rounded ends; Elgin seems to prefer flat ends, thus giving a chance for slight adjustments.

Patronize Our Advertisers

Mistaken Identity—Jack: "Who spilled the mustard on this waffle, dear?"

Wife: "Oh, Jack, how could you? This is lemon pie."

Removing Surplus Cement

By LESTER C. MORGAN

Much time is saved in most convenient method of doing things, and here for instance is a simple but very efficient method of removing surplus cement from our every-day crystal jobs.

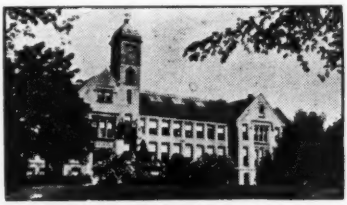
Keep a small bottle of Acetone handy on your bench at all times, moisten a clean cloth with Acetone and rub crystal and bezal. This cuts the surplus cement, leaving the crystal clean and sparkling.

This method does not apply to all brands of cement, but will be found very efficient with brands of a lacquer base.

Acetone may be purchase from your druggist in one pound bottles at a price of 65c. This amount should last the average watchmaker about six months, being very economical with use.

In 1871 a tower clock in New York City kept perfect time for three days, even though the works had been removed for repairs. Janitors pushed the hands ahead every minute, night and day.

"The Pathway to Success"



WATCHWORK
JEWELRY
STONE SETTING
ENGRAVING

Bradley Polytechnic Institute
School of Horology

DEPT. B PEORIA, ILL.

Established 1886

Elgin Welcomes New Year by Sponsoring N. Y. Fair Tie-In

Elgin World's Fair Exhibition Building Is Dramatized in Dozens of Metropolitan Jewelry Windows

New York City, December 31 (SPECIAL)—On December 26, a large number of prominent jewelers in the New York Metropolitan area set up special Elgin traveling displays to tie in with the New York World's Fair "Dawn of a New Day" celebration on New Year's Eve. The celebration included an elaborate fireworks display and ice carnival at the Fair site, "Dawn of a New Day" parties in hotels, theaters and restaurants and an immense nation-wide broadcast of events. In New York's amusement district alone, more than one million people joined in the World's Fair activities.

The Elgin World's Fair displays, which will be used throughout greater New York until January 3, feature the unique and beautiful Elgin Observatory Exhibit Building, as well as the World's Fair scene of Trylon and Perisphere.

Tennessee Guild No. 1

The 60th regular monthly meeting of Guild No. 1 was held December 6th, at the Noel Hotel. The meeting was opened with a large attendance and it was learned that the legislature's program is making great progress. Ninety-eight per cent of the watchmakers of Guild No. 1 have responded favorably to the proposed Licensing Law for Watchmakers in this state. No accurate report has been obtained from the other guilds but it is expected that Tennessee will go one hundred per cent for the licensing of watchmakers.

Please address all communications to D. Osborne, Secretary, 315 5th Ave. N., Nashville, Tenn.

D. OSBORNE, *Sec'y.*

Student Guild No. 1, New York State

Our New York Student Guild No. 1 has been making long strides since school resumed in September. The first two regular meetings of our guild were devoted to drafting plans of initiation for the incoming freshman students in horology. The first quarterly examinations have been completed, and we are happy to announce that twelve freshmen are eligible for admission into the guild. They will be voted upon by the present active membership at the next regular meeting, as provided for in our constitution and by-laws. Already the guild members have started construction of the Graham Dead-Beat Escapement Clock; this guild activity is expected to progress over a period of two years. The finished clock will be presented to the school in the name of the guild. Professor Schlehr is the supervisor in this work, and under his able guidance the clock is rapidly progressing; accuracy and precision are very carefully observed and the blueprints are followed painstakingly.

In keeping with the ancient custom of guilders, this student guild has been adhering to the formality and dignity always associated with that kind of craftsman organization. Officers are referred to as follows: President, as Master Guildsman; Vice President, as Worthy Guildsman; Secretary, as Judicial Guildsman; Treasurer, as Bailiff Guildsman; active members, as Guildsmen; honorary members, as Master Craftsmen. The guild is fast becoming a potent factor in the life of the school, and its influence is developing fast.

Our guild is developing into a major unit in the profession and a power which will soon be heard among the voices which advocate reform.

May we assure Mr. Heald of our spirited support in helping him to fulfill the duties of his office; also we will continue to be as active and helpful as possible to contribute toward the well-being and dignity of the organization.

Otto R. Sabro, Oregon, Moves

Mr. Sabro, previously located at 1672 S. E. Bybee Blvd., moved to larger quarters December 3, 1938. He is now located at 7021 S. E. Milwaukee Avenue.

We wish brother Sabro a world of success in his new quarters.

W. C. Donnelly Dies

William C. Donnelly, 69, of Baltimore, General Time Supervisor of Time Service for the B. & O. Railroad, died December 3, 1938, at Sinai Hospital after a brief illness.

Brother Donnelly had been in charge of watch and clock inspection throughout the B. & O. system since 1922. He was an active member and officer as well as chairman of watch inspectors' committee of the N. R. J. A.

The trade shall miss their old friend. His presence shall be no more. His memory shall be cherished by all who knew and loved him. Our deepest sympathies to Mrs. Donnelly in her bereavement.

Plan Four-Day Week in 1939 at Waltham Factory

A meeting of Waltham Watch Factory employees in December learned of the factory's plans for a four-day week and to arrange to employ as many former employees as possible, distributing the work among them.

Mr. A. C. Hentschel, Sr., Milwaukee, a member of the Wisconsin Board of Examiners in Watchmaking, formerly president of Wisconsin Retail Jewelers Association for ten years and always an active member in the Jewelers Association work, died December 10th at the age of 59.

The watchmakers and jewelers in the state feel the loss of one of their most loyal, active and conscientious friends. Words cannot express the respect and admiration I had for Mr. Hentschel nor the loss I feel upon his passing from us.

B. W. H.

For National and Local Information Contact the Following Organizations

Who Function As a Combined Unit for the Advancement of Our Craft

UNITED HOROLOGICAL ASSOCIATION OF AMERICA, INC.

NATIONAL HEADQUARTERS

3226 EAST COLFAX AVE., DENVER, COLORADO

ORVILLE R. HAGANS, Executive Secretary — THOMAS J. FAGAN, Pres., Boston, Mass.

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Warren S. Turner, Special Rep., 473 Fourteenth St., Oakland.

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O. R. Hagans, Sec., 3226 E. Colfax Ave., Denver.

Denver Guild
D. E. Heigert, Sec., 900 Sherman

Greeley Guild
Howard Weiss, Sec., 829 9th St.

La Junta Guild
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Fred Comstock, Sec., 1819 Pine.

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Bernard Scanlon, State sec., 226 Broad St., Meriden.

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Hartford Guild
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New Haven Watchmakers' Guild
Earl R. Becker, Sec., 215 Fountain St.

Waterbury Watchmakers' Guild
Donald J. Boisvert, Sec., 24 Arch St.

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A. K. Moulton, 550 Boswell Av., Norwich, Secy.

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Greater Miami Watchmakers' Guild
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Watchmakers' Guild of Tampa
L. D. Stallcup, Sec., 216 W. Lafayette St.

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North Shore Guild No. 3
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South Shore Guild No. 4
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New York State Student Watchmakers' Guild
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Dayton Guild
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Olindo Marseglia, Sec., 1123 Staples St., N. E.

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Wisconsin Watchmakers' Assn.
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Racine Guild
H. C. Jensen, Sec., 1648 Keanney Ave., Racine.

Swartchild Announces Novel Friction Jewel Assortments

Inspired by direct inquiry from various watchmakers, the Swartchild Merchandising Department has created a group of various small Friction Jewel Assortments, each of which contains only 24 jewels and sells for the exceptionally low price of 95c per assortment.

A great percentage of the country's watchmakers have Friction Jewel outfits, and many will want small assortments of different types of jewels for a particular kind of repair work. With this in mind, Swartchild & Company is presenting six different small assortments, each for a specific type of repair work. There are balance jewels for bracelet and pocket size watches, plate jewels for bracelet and pocket size watches, and cap jewels of various diameters as well.

One of the features of these assortments is the new style container which is self-charted in that the metric size is imprinted directly under each capsule space (see illustration in advertisement in this issue). Another feature is that every jewel is gauged by separate hole and diameter size in 1/100 m/m variation, so that the necessary jewel can be instantly selected.

In spite of the advantages which these little assortments offer the selling price is almost as low as the price of average bulk jewel assortments which do not have the contents already gauged and separated.

Full description of the contents of each assortment is listed in the Swartchild avertisement in this issue, and all assortments are available.

SPECIAL NOTICES

Payable in advance.
Rates under all headings except "Situations Wanted," $1.50 for first 25 words. Additional words, 5c a word.
SITUATIONS WANTED, 75c for first 25 words. Additional words, 5c a word.
Heavy type, $2.50 for first 25 words. Additional words, 10c a word.
Name, address, initials and abbreviations count as words, and are charged for as part of the advertisement.
If answers are to be forwarded, postage must be enclosed.
Special notice forms close 30th of month.
Unless the advertiser instructs us to publish his name and address, all answers will be directed care THE AMERICAN HOROLOGIST.

BLUEPRINTS

Working drawings for construction of wooden Columbus Clock consisting of a set of 15 blueprints for $3.25 postpaid. Address THE AMERICAN HOROLOGIST.

Working drawings for the complete construction of pinwheel movement clock consisting of eleven blue prints postpaid for $3.00 per set. Address The American

Bestfit Hand Gauge FREE
WITH EACH 6C ASSORTMENT

Save unnecessary labor with the Watch Hand Assortment which enables you to meet all your requirements with a small stock—and which completely eliminates waste as you re-order only the hands you need.

The convenient Hand Gauge **free** with each 6C Assortment containing 8 dozen pair of hands, hour and minute, for every watch from 3 to 10 ligne, including A. S., Bulova, Gruen, Longines, etc.

Sold Through Wholesalers Only

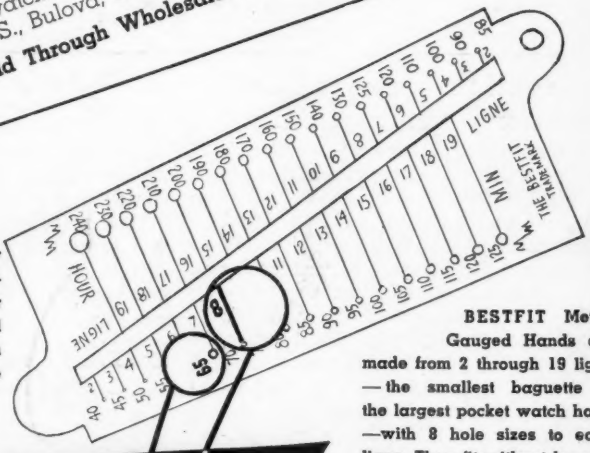
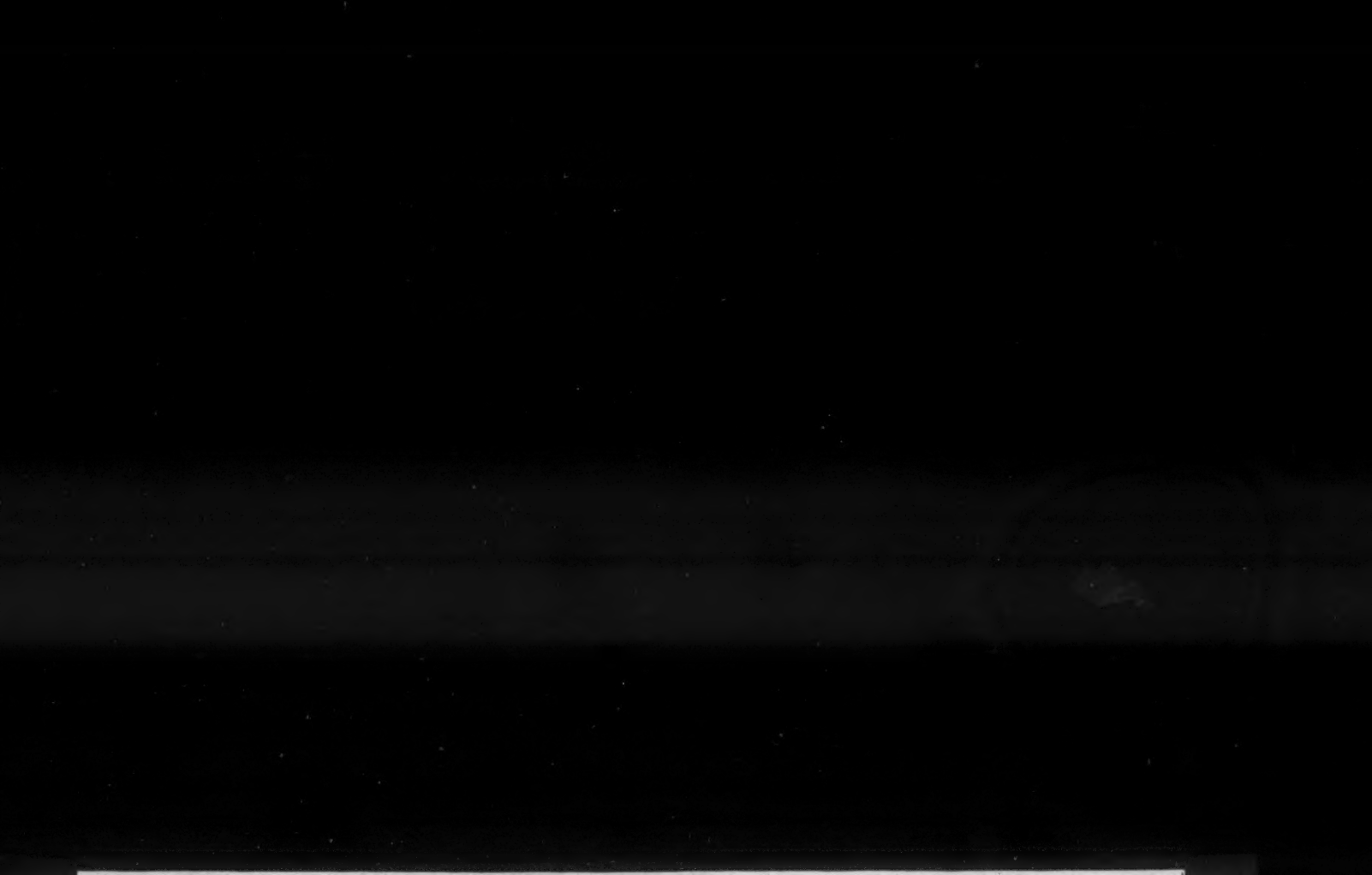


Illustration shows how the Hand Gauge, accurately measuring Hour Wheel, Cannon Pinion and length of Hand, guides you to the bottle holding the proper hand.

BESTFIT Metric Gauged Hands are made from 2 through 19 ligne — the smallest baguette to the largest pocket watch hand —with 8 hole sizes to each ligne. They fit without broaching.

Hands may be had in the following styles: Index, Moon, Cathedral, Cubist and Baton. Colors: Blue, Wine, Gilt and White.

B. JADOW INC.
NEW YORK

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